THE

ONTARIO WATER RESOURCES

COMMISSION

WATER POLLUTION SURVEY

of the

TOWNSHIP OF WILLOUGHBY

COUNTY OF WELLAND

1966

R E P O R T

on

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County of Welland

January 1966

Division of Sanitary Engineering

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INTRODUCTION

A water pollution survey was carried out in the Township of Willoughby during the month of January, 1966. Such surveys are performed routinely and upon request by the Commission in an effort to evaluate existing and potential sources of pollution and water supply.

The examination and sampling of watercourses, sewer outfalls and water supplies; a review of OWRC files on sewage treatment and water supply works; and the results of interviews with local officials constitute the major portion of this report.

GENERAL

The Township of Willoughby is located in the County of Welland, south of the City of Niagara Falls and the Welland River and on the west bank of the Niagara River.

A number of small creeks pass through the township before emptying into the Niagara River. These include Lyons, Usshers, Bayers, Tee, Baker and Black creeks. The Queen Elizabeth Highway between Niagara Falls and Fort Erie bisects the municipality diagonally. The land topography in the area is flat and lightly wooded comprising a large clay plain having a depth of 50-60 feet.

The municipality is largely rural in nature, having a total

assessment of $3.3 million. Of this amount, 50 per cent consists of residential, 34 per cent is agricultural (of more than 10-acre lots), and the remaining 16 per cent represents commercial properties. Areas of residential development are largely centered adjacent to Niagara Falls and Chippawa and at Douglastown, and Snyder. Strip development occurs along the Niagara Parkway.

WATER USE

1. Municipal Supplies

There are no municipally-operated water supply systems within the township. However, 23 connections to the Village of Chippawa system have been effected in the Sodom Road area adjacent to the village.

2. Private Water Supplies

Douglastown Water Works

The Douglastown development as originally conceived is composed of 3 phases consisting of 150 lots. Sixty-four of these have been developed for residential use.

Water for 45 of these homes, a school and a motel, is provided by the Douglas Park Water Consumers Corporation Inc. The system consists of an infiltration gallery in Black Creek, sand and gravel filtration and chlorination. The filtration capacity is 0.034 mgd and the high lift pump capacity is 0.86 mgd. A clear-water reservoir of 17,000 gallons capacity is provided.

For several years, the OWRC has found the system to be

unsatisfactory and has made recommendations for improvements. An unsuitable source of supply, inadequate treatment equipment and poor maintenance of the plant have resulted in a poor quality of treated water from both a bacteriological and chemical standpoint. (see Table I)

Various proposals for overcoming the water supply problems have been made including alterations to the existing facilities or the abandoning of the present water works and a connection to the Township of Bertie supply. The two alternatives were recommended in an OWRC report dated 1962 but no action has resulted.

2. Individual Well Supplies

Individual water supplies can be divided into two categories i.e. normal ground-water supplies from drilled wells and infiltration wells along the shore of the Niagara River.

Ground-water supplies are limited due to sparse overburden aquifers and most waters show a high sulphur content.

Water is usually encountered at a 50-60 foot depth and static levels of 15-20 feet are common. Due to the adverse chemical quality of ground waters, most home owners rely on cistern supplies for domestic uses.

Along the Niagara Parkway, some 50 homes and a number of tourist establishments rely on infiltration wells as a source of water. These wells provide a moderately hard water of uncertain bacteriological quality. (see Table II). Most of the individual supplies are equipped

with chlorinating units although investigations disclosed that few are used continuously. Drinking water is generally secured from a more reliable source in 5 gallon containers.

WASTE DISPOSAL

1. Sanitary Wastes

There are no municipal or community sewerage works in the township. Individual septic tank systems are generally employed. In the heavy clay soil which prevails the operation of such systems frequently presents problems. For this reason, officials of the Welland District Health Unit have prohibited the full development of the Douglastown project.

Due to the timing of this investigation and the weather conditions which prevailed, a thorough assessment of existing disposal facilities was not possible. However, the examination and sampling of road-side ditches at Douglastown combined with an awareness of problems which exist at the Black Creek School confirm that pollution is occurring. A full report on the extent of the problem was included in a joint study undertaken by the OWRC and the health unit in 1962. It is known that the school's disposal system functioned poorly even then and the septic tank now requires regular pumping.

Little difficulty is reported with individual waste disposal facilities in other sections of the township due to large lot sizes and relative isolation. In isolated cases, private drains discharge sewage to the Niagara River. The local health unit is taking appropriate action where necessary.

2. Refuse Disposal

The township's refuse disposal site does not contribute to the pollution of any watercourse.

3. Discussion of Sample Analyses

During the survey, samples were secured from various water supply systems and from street ditches. The results of analyses performed at the OWRC laboratory are appended to this report.

The samples from the Caribou Motel are indicative of the quality of water provided by the Douglastown system. Excessive hardness, iron, and turbidity are common to this source. Colour and phenol determinations, not performed on these samples, usually exceed OWRC objectives. Bacteriologically, the results of samples indicate that 4 of 18 samples taken during the past 18 months were unsatisfactory. It is apparent that water treatment is not reliable and that a danger to the health of the consumers frequently exists.

The quality of ground water obtained from drilled wells in the central portion of the township is evidenced in Table II, Type II. Hardness, particularly noted in the sulphate concentration, would render this water unfit for most domestic uses.

The remaining water supply samples were taken from residences on the Parkway which utilize infiltration wells. For the most part, these waters can be considered hard although chemically the quality is quite satisfactory. On the other hand, 8 of 20 samples show the presence of coliform bacteria and should be classed as doubtful quality from a

bacteriological standpoint.

Three samples of the contents of street ditches in the Douglastown development were submitted for analysis. In each case, the laboratory results (see Table III) indicate pollution of a domestic nature.

SUMMARY AND CONCLUSIONS

A pollution study of the Township of Willoughby was undertaken on January 19, 20, 1966 to assess the present facilities for water and sewage treatment and to determine future requirements.

Existing supplies of water, both individual and community, are not of acceptable quality. Drilled, dug, and infiltration wells provide water with adverse chemical properties and/or of doubtful bacteriological quality. The community supply at Douglastown is unsatisfactory due to the inadequacy of existing treatment works.

With regard to the disposal of domestic wastes, heavy clay soil conditions hamper the effectiveness of septic tank systems in the Douglastown area. As a result, pollution of street ditches has occurred and local health officials have been forced to restrict further building in the area.

The municipality's close proximity to Buffalo and Niagara Falls makes it a prime area for residential development. Without water and sewer services, such development will not proceed.

RECOMMENDATIONS

1. The township authorities should take steps to provide for a

safe and adequate supply of water to the Douglastown area. Such steps should include a comprehensive study of the feasibility of providing water service to homes on the Niagara Parkway and the hamlet of Snyder.

2. While present conditions would not appear to warrant the development of a sewage works scheme, the ultimate growth of the municipality is dependent on such a program. Existing problems should be corrected on an individual basis under the direction of the local health authority until such time as sewage works are available.

Approved by G H Mills

G. H. Mills, P. Eng.,
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Prepared by: C. E. Letman

TABLE I

SAMPLE RESULTS

DOUGLASTOWN WATER WORKS

Bacteriological

Date of Sample	Location of Sample	RESULTS	
		Satisfactory	Unsatisfactory
1966 5 samples	various locations	3	2
1965 10 samples	various locations	7	3
1964 10 samples	various locations	9	1
1963 11 samples	various locations	11	0

Chemical

Date of Sample	Hardness as $CaCO_3$ (ppm)	Alkalinity as $CaCO_3$ (ppm)	Iron as Fe (ppm)	Chloride as Cl (ppm)	pH at Lab	Turbidity Units	Phenols (ppb)
1966	330	104	2.6	55	7.4	27	0

TABLE II

SAMPLE RESULTS

Private Water Supplies

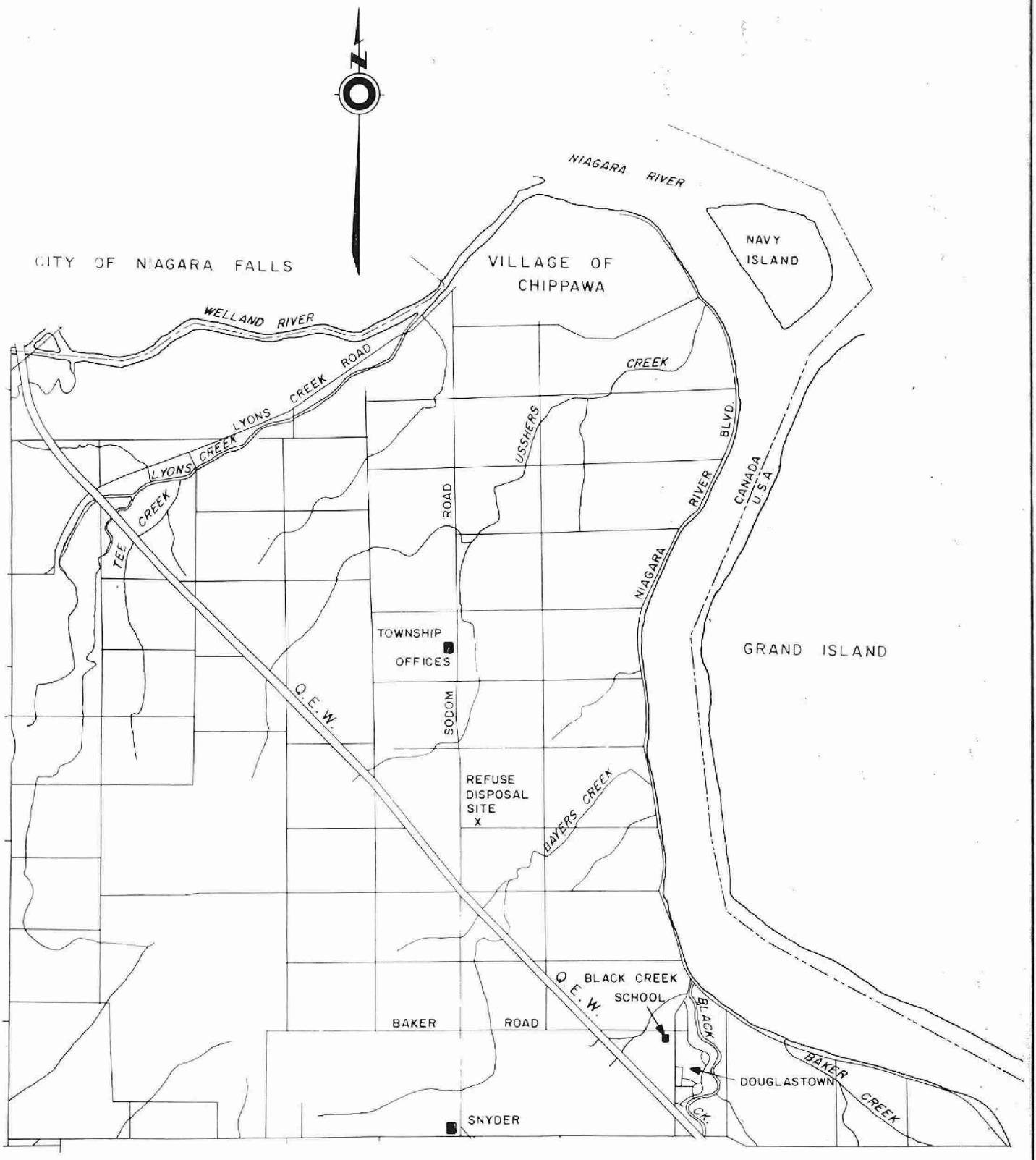
Location	Coliforms per 100 ml	Hardness as $CaCO_3$ (ppm)	Alkalinity as $CaCO_3$ (ppm)	Iron as Fe (ppm)	Chloride as Cl (ppm)	pH at Lab	Turbidity Units	Phenols (ppb)	Sulphate as SO_4 (ppm)
TYPE I									
INFILTRATION OR CRIB WELLS									
NIAGARA PARKWAY									
River Bell Motel	0	112	135	0.10	71	9.2	1.3	0	
J. Bruce	0	180	102	0.74	28	7.8	13.0	0	
F. Climenhage	44	200	147	0.29	31	7.9	4.5	0	
E. R. Taylor	10,600	260	144	0.26	35	7.7	2.6	0	
C. Ruch	0	296	183	0.15	68	7.7	1.8	0	
J. Clark	0	376	131	0.18	63	7.7	3.6	0	
Gunning Farms	510	144	97	0.46	28	7.9	11.5	0	
TYPE II									
J. Graaskamp Sodom Road		2,240	102	3.5	143	7.6	32	0	1,720

TABLE III

SAMPLE RESULTS

Date of Sampling - January 20, 1966

Source	5-Day BOD (ppm)	Solids (ppm)		Coliforms per 100 ml
		Total	Susp.	
Linwood Ave. Ditch	10	880	82	350,000
Westbrook Ave. Ditch	5	1,510	416	Broken in Transit
Westbrook Ave. Ditch	340	2,504	786	820,000



ONTARIO WATER RESOURCES COMMISSION

TOWNSHIP OF WILLOUGHBY WATER POLLUTION SURVEY 1966

SCALE: 0 1/2 1 2 MILES	
DRAWN BY: W.R.E.	DATE: JANUARY 1966
CHECKED BY:	DRAWING Nº: 66-24